ligating the fed insect behind the ganglionic mass soon causes the flow of urine to cease.

In fed animals which have been ligated at various points, only those portions which include the ganglionic mass contain active hæmolymph (as assayed on isolated tubules).

The ganglionic mass in the mesothorax contains several groups of neurosecretory cells. The diuretic activity, as estimated with tubule preparations, is confined to the cells of the two hindmost groups.

I thank Prof. V. B. Wigglesworth for his advice and encouragement, and the Department of Scientific and Industrial Research for financial support.

S. H. P. Maddrell

Department of Zoology,
Downing Street,
Cambridge.

[1] Buxton, P. A., *Trans. Roy. Ent. Soc. Lond.*, **78**, 227 (1930).
[2] Wigglesworth, V. B., *J. Exp. Biol.*, **8**, 411 (1931).

CYTOLOGY

Chromosomes of the Fungus *Cyathus*

Although records of chromosome counts in fungi are fairly numerous, few of these can be considered completely reliable. Indeed the small size of fungus chromosomes and the limitations of techniques of staining make difficult the unequivocal identification of chromosomes as such in many published records.

An extensive list of chromosome numbers can be found in the review of our knowledge of fungus nuclei published by L. S. Olive[1]. Referring to Basidiomycetes (especially members of the Agaricales), Olive notes (p. 548): "reports of odd numbers of chromosomes are rare, as are reports of haploid numbers greater than 8".

Among the Gasteromycetes (to which group the genus *Cyathus* belongs) about a dozen species appear to have been examined, and in these the haploid number given is either 2 or 4 (in one instance a possible 3).

This brief reference is sufficient to indicate a probable basis for the assumption, apparently widespread among botanists, that the haploid chromosome number for common fleshy fungi is 3, 4 or occasionally 6.

That larger chromosome numbers may occur among members of the Agaricales is shown by the work of D. T. Hughes[2] on the wild and cultivated varieties of the common mushroom. The photographs published by Hughes establish the haploid number of 12 for both wild- and cultivated-types.

The accompanying photograph shows that the chromosome number for the fungus *Cyathus stercoreus* (Schw.) De Toni is $n = 12$. So far as we are aware, this is the largest number reported to date for a member of the Gasteromycetes. The demonstration was made possible by the use of a special propionocarmine staining technique developed by one of us (B. L.). The new technique will be described elsewhere.

From young fruit-bodies of *Cyathus stercoreus* grown on nutrient agar in the laboratory, periodioles were removed and fixed. By careful dissection, young basidia were teased out on to slides and squashed gently.

The photograph reproduced as Fig. 1 shows 12 bivalent chromosomes at prophase of the first meiotic division in a young basidium. In the actual preparations each chromosome can be seen in its entirety, and considerable difference in size and shape of chromosomes is observable. Fig. 2 is a drawing based on the chromosomes as seen in the several focal planes not shown by the photograph. Other similar preparations confirm the count given. Work in progress indicates that chromosome numbers of other species of *Cyathus* are also of the same order and clearly not less than $n = 8$.

Fig. 1. Photograph of twelve bivalent chromosomes of *Cyathus stercoreus* as seen in a young basidium. (× *c.* 3,200)

Fig. 2. Drawing representing the same chromosomes as seen by focusing through the preparation. (× *c.* 3,200)

Apparently the chromosomes of *Cyathus* are quite large (at least in the stage shown) in comparison with those of many fungi. It may be that further study will reveal distinctive morphology by which they may be separately identified.

The possibility of determining chromosome number in the various species and races of *Cyathus* will facilitate investigations of genetic mechanisms and of the problems of species relationships in these interesting fungi[3].

This work was carried out with a grant to one of us (H. J. B.) from the National Research Council of Canada.

Benjamin C. Lu
Harold J. Brodie

Department of Botany,
University of Alberta,
Edmonton, Canada.

[1] Olive, L. S., *Bot. Rev.*, **19**, 439 (1953).
[2] Hughes, D. T., *Nature*, **190**, 285 (1961).
[3] Brodie, H. J., *Mycologia*, **40**, 614 (1948).